From: Casey Pickering

Sent: Monday, July 08, 2019 03:16 PM

To: Williams, Christopher

CC: Mia, Marcia; Hoyt, Daniel; Cox, John

Subject: RE: Low Production Well Analysis

Hi all, please see below for additional documentation in response to this request. Note
we included references to the previously delivered results Excel file (OOOOa Reports
Evaluation_ERG_2019-05-15.xlsx) in case it helps to follow the methodology. Please let
me know if you have any questions on the below.

Thanks,

Casey

EPA is interested in determining if each well (or collection of wells at a single
facility) in NSPS OOOOa compliance reports is a low production well site. Low
production well sites are defined by the proposed amended rule as the "average combined
oil and natural gas production for the wells at the site less than 15 barrels of oil
equivalent (boe) per day averaged over the first 30 days of production" (see 83 FR
52056). ERG performed a multi-step analysis of data provided by OC to assess which if
any wells meet the "low production site" definition. In Step 1, ERG manipulated well ID
numbers to standardize the format and facilitate matching to an external data set-
DrillingInfo's DI Desktop (accessed via EPA/ERG license agreement), which provides
well-level production data and identifying information such as well ID, operator, and
location. Step 1 included sub-steps such as removing blank and extraneous characters.
Step 1 resulted in matching approximately 70% of well IDs from the OC dataset with DI
Desktop data [see xlsx worksheet "ERG_Well IDs" columns D through AH]. In Step 2, ERG
calculated site-level production in terms of BOE, to compare to the "low production
site" definition. Step 2 included two sub-steps: (2a) ERG calculated average initial
BOE/day production for each well, using each well's first 30 days of reported
production estimated from DI Desktop data [see xlsx worksheet "ERG_Well IDs" columns AL
through BD]; (2b) ERG calculated a site-level average of values from Step 1, using data
from all "valid" well-level records; and assigned flag if the value was less than 15
BOE/day [see xlsx worksheet "ERG_Pivot"]. In executing Step 2a, ERG applied the
following specific methodology and assumptions to analyze available DI Desktop data
elements for estimating first 30 day production. Specifically:

2a.i. Pull COMPLETION_DATE (mm/dd/yyyy) from DI Desktop, if available

2a.ii. Pull FIRST_PROD_DATE (mm/yyyy) from DI Desktop, if available

2a.iii. Calculate number of production days within FIRST_PROD_DATE based on completion
date (e.g., analyzing completion date of 3/5/2019 and first production date of 3/2019
would result in assuming 26 days of production within FIRST_PROD_DATE)

2a.iv. For records without valid COMPLETION_DATE, assume 30 days of production are
represented within FIRST_PROD_DATE

2a.v. For records with a full month of production (30-31 days) represented within
FIRST_PROD_DATE, estimate "first 30 BOE daily" production from fields FIRST_LIQ and
FIRST_GAS (by dividing these monthly production values by the number of days in the
month, then using BOE conversion on the gas production value)

2a.vi. For records without a full month of production represented within
FIRST_PROD_DATE, estimate "first 30 BOE daily" by essentially appending data from
fields LIQ_PRAC_IP_DAILY and GAS_PRAC_IP_DAILY to create a picture of the first full 30
days. To accomplish this, ERG calculated a weighted average of: (1) daily BOE
production calculated from fields FIRST_LIQ and FIRST_GAS divided by the number of days
within FIRST_PROD_DATE; and (2) daily BOE production from fields LIQ_PRAC_IP_DAILY and
GAS_PRAC_IP_DAILY). The weighting approach uses the number of days within

FIRST_PROD_DATE for element (1), and 30 minus that number of days for element (2).

From: Williams, Christopher <Williams.Christopher@epa.gov>

Sent: Tuesday, July 2, 2019 8:18 AM

To: Casey Pickering <Casey.Pickering@erg.com>

Cc: Mia, Marcia <Mia.Marcia@epa.gov>; Hoyt, Daniel <Hoyt.Daniel@epa.gov>; Cox, John <cox.john@epa.gov>

Subject: Low Production Well Analysis

Casey,

Thank you to the ERG team for your efforts on the Low Production Well Analysis!

As a follow-up to that effort, could ERG provide a short paragraph style summary of the work that they did and include:

How they reconciled well IDs (I think they had to manipulate some?)

How they calculated BOE, including when wells were added to the same site over time. I know we discussed this, but I don't recall what we ultimately decided. I think it was to average production over all of the wells at the site, and redetermine the average when they added a new well. For getting the 30 days, I believe they used First_Prod_Date and determined First_Liq/Gas then added any days from Liq_Prac_IP_Daily (or Gas) until they had 30 days. Need to make sure I understood this correctly.

Anything else they think will be relevant.

Marcia, please jump in with anything else I may have left out. I understand that we need this provided to us, sooner rather than later.

Thanks,

Chris